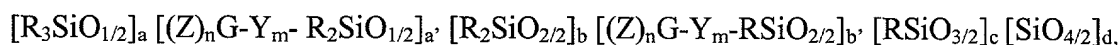


**WHAT IS CLAIMED IS:**

1. Compositions, which can be crosslinked by radiation to give elastomers or elastomeric coatings, which comprise:

- (a) high-molecular weight siloxanes with multiple (meth)acrylate functional groups; and
- (b) reinforcing fillers selected from the group consisting of silicone resins and silicone dioxide fillers,

wherein the siloxanes (a) have the general structure:



wherein

R is a linear or branched, alkyl, alkenyl or aryl radical which may be substituted with halogen atoms,

G(Z)<sub>n</sub> is a (meth)acrylfunctional radical, wherein G is a (n+1) valent radical derived from a hydroxy compound with 3 to 10 carbon atoms, 1 to 6 hydroxy groups, 0 to 1 carboxylic ester groups and 0 to 2 ether linkages, which may optionally be unsaturated or alkoxyated with ethylene oxide, propylene oxide or mixtures thereof,

Y is -OOC-CHR'-CH<sub>2</sub>- or -OOC-CHR' (CH<sub>3</sub>)-,

m is 0 or 1,

n is 1-6,

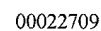
Z is -OC-CR'=CH<sub>2</sub> and may additionally comprise carboxylic acid radicals free of double bond,

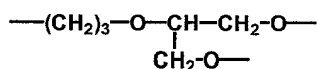
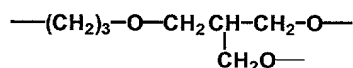
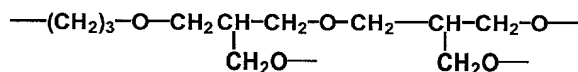
R' is hydrogen or methyl,

a is 0-20,

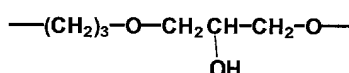
d is 0-40,

6. The compositions according to claim 1 wherein m is 0 and G is selected from the group of

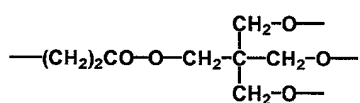




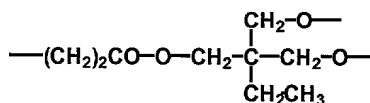
or



7. The compositions according to claim 1 wherein m is 1 and -Y-G- is

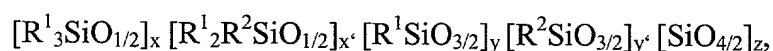


or



8. The compositions according to claim 1 wherein the reinforcing filler is selected from the group consisting of fumed silica, precipitated silica, hydrosols and silicates.

9. The compositions of claim 1 wherein the reinforcing filler is a resin of the general structure



wherein

R<sup>1</sup> is a monovalent alkyl or alkenyl radical with 1 to 4 carbon atoms, phenyl, hydroxy, methoxy or ethoxy,

R<sup>2</sup> is a (meth)acrylated hydroxyalkyl radical with 1 to 4 carbon atoms in the alkyl group,

having a average molecular weight of 500 to 100,000, with the proviso that  $(x+x')/(y+y'+z)$  is 0.5 to 1.5 and  $(y+y')/z$  is 0 to 0.4.

10. The compositions according to claim 9 wherein y and y' are 0, R<sup>1</sup> is methyl, R<sup>2</sup> is

acryloxyethyl or acryloxypropyl, the ratio  $(x+x')/z$  is 0.7 to 0.9 and the average molecular weight of the resin is 500 to 10000.

11. The compositions according to claim 9 wherein  $y$  and  $y'$  are 0,  $R^1$  is methyl, hydroxy, methoxy or alkoxy, the ratio  $(x+x')/z$  is 0.7 to 0.9, the average molecular weight of the resin is 500 to 10000, with the proviso that the resin contains less than 4% by weight, of silicon-bound hydroxy or alkoxy groups.

12. The compositions according to claim 1 wherein the reinforcing filler has been treated with methoxytrimethylsilane, ethoxytrimethylsilane, dimethyldichlorosilane, chlorotrimethylsilane, octamethylcyclotetrasiloxane, hexamethyldisilazane, silanol fluids, gamma-aminopropyltrimethoxysilane or gamma-methacryloxypropyltrimethoxysilane.

13. The compositions according to claim 1 wherein the reinforcing filler is a fumed or precipitated silica, which has been treated with a hydrophobizing silane agent.

14. The compositions according to claim 1, which further comprise one or more additives selected from the group consisting of extending fillers, catalysts, photoinitiators, photosensitizers, crosslinkers, co-curing additives, adhesion promoters, pigments and dyes.

15. The composition according to claim 14, wherein amount of extending filler is from about 1 to about 150 weight parts per 100 parts of siloxane (a) and reinforcing filler.

16. The composition according to claim 14 wherein the amount of catalysts, photoinitiators, photosensitizers, crosslinkers, co-curing additives, adhesion promoters, pigments or dyes is from about 0.1 to about 15 weight parts per 100 parts of the mixture of siloxane (a) and reinforcing filler (b).

17. The compositions according to claim 15 where the extending filler is selected from the group consisting of carbonates, hydrogen carbonates, oxides and hydroxides of calcium, magnesium or barium, talc, clay, titanium dioxide, barium zirconate, chalk, quartz, diatomaceous

earth, polymeric beads/powders, iron oxide, metal powders, carbon black, metal salts, thermal conductive agents, magnetic and radio masking agents.

18. The compositions according to claim 15 which comprise about 20 to about 50 weight parts of extending filler per 100 parts of siloxane (a) and reinforcing filler (b).

19. The compositions according to claim 16 which comprise from about 1 to about 10 weight parts of photoinitiators per 100 parts siloxane (a) and reinforcing filler (b).

20. A process for preparing elastomers or elastomeric coatings which comprises irradiating the compositions according to claim 1.

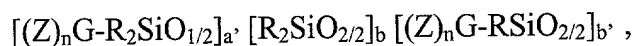
21. Conformal coatings and pressure-sensitive adhesives obtained by the irradiation of the compositions of claim 1.

22. A method of high-speed radiation curing of calendared stock to give elastomeric coatings which comprises the compositions according to claim 1 with electrom beams or UV light.

23. Compositions, which can be crosslinked by radiation to give elastomers and elastomeric coatings, comprising:

- (a) high-molecular weight siloxanes with multiple (meth)acrylate functional groups; and
- (b) reinforcing fillers selected from the group consisting of silicone resins or silicone dioxide fillers.

wherein the siloxane (a) have the general structure:



wherein

R is an alkyl radical with 1 to 8 carbon atoms, a fluorinated alkyl radical with 1 to 8 carbon atoms, or phenyl,

a' is 2,

b is 2100 to 10000,

b' is 2 to 10,

m is 0,

$G(Z)_n$  is  $-(CH_2)_kO-C(O)-CR'=CH_2$ ,

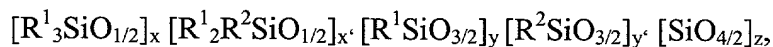
R' is hydrogen or methyl and

k is 2 to 12.

24. The compositions according to claim 23 wherein R is methyl, R' is hydrogen, b is 2100 to 5000 and k is 3-6.

25. The compositions of claim 23 wherein the reinforcing filler is selected from the group of fumed silica, precipitated silica, hydrosols and silicates.

26. The compositions of claim 23 wherein the reinforcing filler is a resin of the general structure



wherein

R<sup>1</sup> is a monovalent alkyl or alkenyl radical with 1 to 4 carbon atoms, phenyl, hydroxy, methoxy or ethoxy,

R<sup>2</sup> is a (meth)acrylated hydroxyalkyl radical with 1 to 6 carbon atoms in the alkyl group,

having a number average of 500 to 100,000, with the proviso that  $(x+x')/(y+y'+z)$  is 0.5 to 1.5 and  $(y+y')/z$  is 0 to 0.4.

27. The compositions according to claim 23 wherein y and y' are 0, R<sup>1</sup> is methyl, R<sup>2</sup> is acryloxyethyl or acryloxypropyl, the ratio  $(x+x')/z$  is 0.7 to 0.9 and the average molecular weight of the resin is 500 to 10000.

28. The compositions according to claim 23 wherein y and y' are 0, R<sup>1</sup> is methyl, hydroxy,

methoxy or alkoxy, the ratio  $(x+x')/z$  is 0.7 to 0.9, and the average molecular weight of the resin is 500 to 10000, with the proviso that the resin does contain less than 4% by weight, of silicon-bound hydroxy or alkoxy groups.

29. The compositions according to claim 23 wherein the reinforcing filler has been treated with methoxytrimethylsilane, ethoxytrimethylsilane, dimethyldichlorosilane, chlorotrimethylsilane, octamethylcyclotetrasiloxane, hexamethyldisilazane, silanol fluids, gamma-aminopropyltrimethoxysilane or gamma-methacryloxypropyltrimethoxysilane.

30. The compositions according to claim 23 which further comprises one or more additives from the group consisting of extending fillers, catalysts, photoinitiators, photosensitizers, crosslinkers, co-curing additives, adhesion promoters, pigments and dyes.

31. The compositions according to claim 30, wherein the amount of extending filler is from about 1 to about 150 weight parts per 100 part of siloxane (a) and reinforcing filler (b).

32. The compositions according to claim 30, wherein the amount of the catalysts, photoinitiators, photosensitizers, crosslinkers, co-curing additives, adhesion promoters, pigments or dyes is from about 0.1 to about 15 weight parts per 100 parts of the mixture of siloxane (a) and reinforcing filler (b).

33. The compositions according to claim 31 wherein the extending filler is selected from the group consisting of carbonates, hydrogen carbonates, oxides and hydroxides of calcium, magnesium or barium, talc, clay, titanium dioxide, barium zirconate, chalk, quartz, diatomaceous earth, polymeric beads/powders, iron oxide, metal powders, carbon black, metal salts, thermal conductive agents, magnetic and radio masking agents.

34. The compositions according to claim 32 wherein the amount of photoinitiators is from about 1 to about 10 weight parts per 100 parts of siloxane (a) and reinforcing filler (b).

35. A process for the preparation of elastomers or elastomeric coatings which comprises

irradiating the compositions according to claim 23.

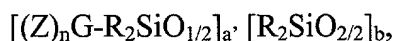
36. Conformal coatings and pressure-sensitive adhesives made by irradiation of the compositions of claim 23.

37. A method of high-speed radiation curing of calendared stock to give elastomeric coatings which comprises irradiating the compositions according to claim 23 with electrom beams or UV light.

38. Compositions, which can be crosslinked by radiation to give elastomers or elastomeric coatings, comprising:

- (a) high-molecular weight siloxanes with multiple (meth)acrylate functional groups; and
- (b) reinforcing fillers selected from the group consisting of silicone resins and silicone dioxide fillers.

wherein the siloxanes (a) have the general structure:



wherein

R is an alkyl radical with 1 to 8 carbon atoms, a fluorinated alkyl radical with 1 to 8 carbon atoms or phenyl,

a' is 2,

b is 800 to 10000 and

G(Z)<sub>n</sub> is -(CH<sub>2</sub>)<sub>3</sub>O-C(CH<sub>2</sub>CH<sub>3</sub>)(CH<sub>2</sub>O-C(O)-CR'=CH<sub>2</sub>)<sub>2</sub>, and

R' is hydrogen or methyl.

39. The compositions according to claim 38 wherein R is methyl, R' is hydrogen, and b is 2000-5000.

40. The compositions according to claim 38 wherein the reinforcing filler is selected from the



group of fumed silica, precipitated silica, hydrosols and silicates.

41. The compositions according to claim 38 wherein the reinforcing filler is a resin of the general structure



wherein

$R^1$  is a monovalent alkyl or alkenyl radical with 1 to 4 carbon atoms, phenyl, hydroxy, methoxy or ethoxy,

$R^2$  is a (meth)acrylated hydroxyalkyl radical with 1 to 6 carbon atoms in the alkyl group,

having a number average of 500 to 100,000, with the proviso that  $(x+x')/(y+y'+z)$  is 0.5 to 1.5 and  $(y+y')/z$  is 0 to 0.4.

42. The compositions according to claim 38 wherein  $y$  and  $y'$  are 0,  $R^1$  is methyl,  $R^2$  is acryloxyethyl or acryloxypropyl, the ratio  $(x+x')/z$  is 0.7 to 0.9 and the average molecular weight of the resin is 500 to 10000.

43. The compositions according to claim 38 wherein  $y$  and  $y'$  are 0,  $R^1$  is methyl, hydroxy, methoxy or alkoxy, the ratio  $(x+x')/z$  is 0.7 to 0.9, the average molecular weight of the resin is 500 to 10000, with the proviso that the resin does contain less than 4% by weight, of silicon-bound hydroxy or alkoxy groups.

44. The compositions according to claim 38 wherein the reinforcing filler has been treated with methoxytrimethylsilane, ethoxytrimethylsilane, dimethyldichlorosilane, chlorotrimethylsilane, octamethylcyclotetrasiloxane, hexamethyldisilazane, silanol fluids, gamma-aminopropyltrimethoxysilane or gamma-methacryloxypropyltrimethoxysilane.

45. The compositions according to claim 38 which further comprises one or more additives

selected from the group consisting of extending fillers, catalysts, photoinitiators, photosensitizers, crosslinkers, co-curing additives, adhesion promoters, pigments and dyes.

46. The compositions according to claim 45, wherein the amount of extending filler is from about 1 to about 150 weight parts of siloxane (a) and reinforcing filler (b).

47. The compositions according to claim 45 wherein the amount of catalysts, photoinitiators, photosensitizers, crosslinkers, co-curing additives, adhesion promoters, pigments or dyes is from about 0.1 to about 15 weight parts per 100 parts of siloxane (a) and reinforcing filler (b).

48. The compositions according to claim 45 wherein the extending filler is selected from the group consisting of carbonates, hydrogen carbonates, oxides and hydroxides of calcium, magnesium or barium, talc, clay, titanium dioxide, barium zirconate, chalk, quartz, diatomaceous earth, polymeric beads/powders, iron oxide, metal powders, carbon black, metal salts, thermal conductive agents, magnetic and radio masking agents .

49. The compositions according to claim 47 wherein the amount of photoinitiators is from about 1 to about 10 weight parts per 100 parts of siloxane (a) and reinforcing filler (b).

50. A process for the preparation of elastomers or elastomeric coatings which comprise irradiating of the compositions according to claim 34.

51. Conformal coatings or pressure-sensitive adhesives obtained by irradiation of the compositions according to claim 34.

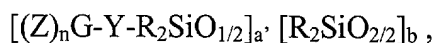
52. A method of high-speed radiation curing of calendared stock to give elastomeric coatings by irradiating the compositions of claim 1 with electrom beams or UV light.

53. Compositions, which can be crosslinked by radiation to give elastomeric coatings, comprising:

- (a) high-molecular weight siloxanes with multiple (meth)acrylate functional groups; and

(b) reinforcing fillers selected from the group consisting of silicone resins  
and silicone dioxide fillers,

wherein the siloxanes (a) have the general structure



wherein

R is an alkyl radical with 1 to 8 carbon atoms, a fluorinated alkyl radical with 1 to 8 carbon atoms or phenyl,

a' is 2,

b is 800 to 10000,

-Y-G(Z)<sub>n</sub> is -(CH<sub>2</sub>)<sub>2</sub>C(O)-O-C(CH<sub>2</sub>O-C(O)-CR'=CH<sub>2</sub>)<sub>3</sub>, and

R' is hydrogen or methyl.

54. The compositions according to claim 53 wherein R is methyl, R' is hydrogen, and b is 2000-5000.

55. The compositions according to claim 53 wherein the reinforcing filler is selected from the group consisting of fumed silica, precipitated silica, hydrosols and silicates.

56. The compositions according to claim 53 wherein the reinforcing filler is a resin of the general structure



wherein

R<sup>1</sup> is a monovalent alkyl or alkenyl radical with 1 to 4 carbon atoms, phenyl, hydroxy, methoxy or ethoxy,

$R^2$  is a (meth)acrylated hydroxyalkyl radical with 1 to 6 carbon atoms in the alkyl group,

having a number average of 500 to 100,000, with the proviso that  $(x+x')/(y+y'+z)$  is 0.5 to 1.5 and  $(y+y')/z$  is 0 to 0.4.

57. The compositions according to claim 53 where  $y$  and  $y'$  are 0,  $R^1$  is methyl,  $R^2$  is acryloxyethyl or acryloxypropyl, the ratio  $(x+x')/z$  is 0.7 to 0.9 and the average molecular weight of the resin is 500 to 10000.

58. The compositions according to claim 53 wherein  $y$  and  $y'$  are 0,  $R^1$  is methyl, hydroxy, methoxy or alkoxy, the ratio  $(x+x')/z$  is 0.7 to 0.9, the average molecular weight of the resin is 500 to 10000, with the proviso that the resin does contain less than 4% by weight, of silicon-bound hydroxy or alkoxy groups.

59. The compositions according to claim 53 wherein the reinforcing filler has been treated with methoxytrimethylsilane, ethoxytrimethylsilane, dimethyldichlorosilane, chlorotrimethylsilane, octamethylcyclotetrasiloxane, hexamethyldisilazane, silanol fluids, gamma-aminopropyltrimethoxysilane or gamma-methacryloxypropyltrimethoxysilane.

60. The compositions according to claim 53 which further comprise of one or more additives selected from the group consisting of extending fillers, catalysts, photoinitiators, photosensitizers, crosslinkers, co-curing additives, adhesion promoters, pigments and dyes.

61. The compositions according to claim 60, wherein the amount of extending filler is from about 1 to about 150 weight parts per 100 part of siloxane (a) and reinforcing filler (b).

62. The compositions according to claim 60, wherein the amount of catalysts, photoinitiators, photosensitizers, crosslinkers, co-curing additives, adhesion promoters, pigments or dyes is from about 15 weight parts of siloxane (a) and reinforcing filler (b).

63. The compositions according to claim 61 wherein the extending filler is selected from the

group consisting of carbonates, hydrogen carbonates, oxides and hydroxides of calcium, magnesium or barium, talc, clay, titanium dioxide, barium zirconate, chalk, quartz, diatomaceous earth, polymeric beads/powders, iron oxide, metal powders, carbon black, metal salts, thermal conductive agents, magnetic and radio masking agents.

64. The compositions according to claim 62 wherein the amount of photoinitiators is from about 1 to about 10 weight parts of per 100 parts of siloxane (a) and reinforcing filler (b).

65. A process of preparing elastomers or elastomeric coatings by irradiation of the compositions of claim 53.

66. Conformal coatings and pressure-sensitive adhesives obtained by irradiation of the compositions of claim 53.

67. A method of high-speed radiation curing of calendared stock to give elastomeric coatings which comprises irradiating the compositions according to claim 53 with electrom beams or UV light.